



Commercial Harbor Craft Proposed Regulation Workshop

Sacramento
September 19, 2006



California Environmental Protection Agency

Air Resources Board

Background

- ♦ Reduce emissions mainly through the use of engine repowers and retrofits.
- ♦ First priority – Near shore impacts
- ♦ Fulfill Goods Movement Goals and make progress on Diesel Risk Reduction Plan commitment

Commercial Harbor Craft Goods Movement Emission Reduction Plan Goals

- ◆ 2010 -25%
- ◆ 2015 -30%
- ◆ 2020 -40%

Both PM and NOx reductions

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Two Step Process

- ◆ Step 1: Repower
 - Tier 0 to Tier II
 - Tier I to Tier III
- ◆ Step 2: Future
 - Element to reduce NOx and PM further

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Commercial Harbor Craft Vessel Types

- ◆ Includes many types of vessels including;
- ◆ Tug/Tow
- ◆ Ferries
- ◆ Fishing Vessels
 - Commercial Fishing
 - Passenger Fishing
- ◆ Crew, Supply, Pilot, Work, and Other Vessels

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Marine Engine Standards

- ◆ Tier 0 Engines are unregulated
- ◆ U.S. EPA has established Tiered Standards
- ◆ Tier I and Tier II
 - Vary by engine displacement and model year
- ◆ Tier III / IV(?) are not yet promulgated

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Commercial Harbor Craft Proposed Regulation Overview

- ◆ Separated Non-fishing and Fishing Vessels
- ◆ Focus on Non-fishing Emission Reductions
- ◆ Option of an Alternative Compliance Plan
- ◆ Targeting Old, High Use Engines First
- ◆ On-going Engine Emission Testing To Support Regulation
- ◆ Scheduled for Board Consideration Feb. '07

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Exemptions

- ◆ Recreation Vessels
- ◆ Ocean Going Vessels
- ◆ Historic Vessels
- ◆ Low Use (Propulsion and Auxiliary)
- ◆ Engines Using Alternative Fuel Only
- ◆ Military Tactical Support Vessels

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New Engines and Vessels

- ◆ Fishing and Non-fishing
- ◆ Must meet U.S. EPA Marine Emission Standards Applicable on the purchase date.

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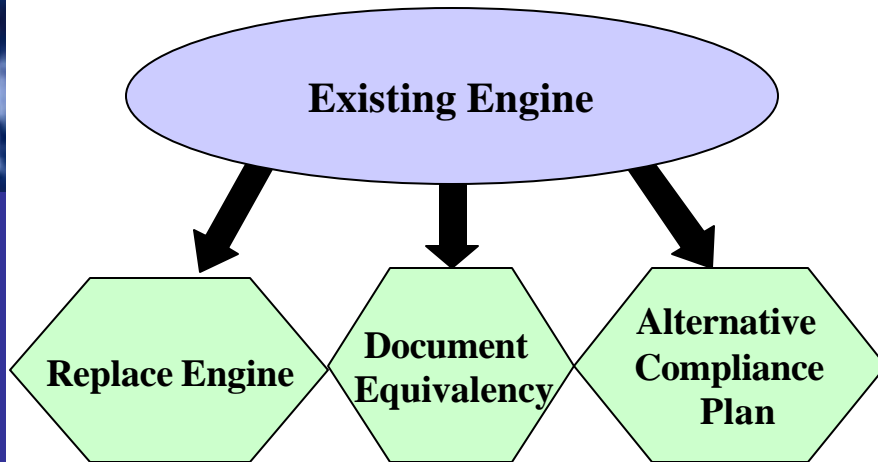
Existing Non-Fishing Vessel Overview

- ◆ Current Population mainly Tier 0 engines
- ◆ Proposed Compliance Dates (2008-2014)
 - Repower with Current Certified Engine or,
 - Documented Equivalent Emissions or,
 - Alternative Compliance Plan



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Non-Fishing Vessels



Compliance Dates 2008 - 2014

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Existing Non-Fishing Vessel Compliance Dates

| Annual Hours of Operation | Engine Model Year Pre-1975 | Engine Model Year 1976-1989 | Engine Model Year 1990-1999 | Engine Model Year 2000-2006 |
|---------------------------|----------------------------|-----------------------------|-----------------------------|-----------------------------|
| >300-<1500 | 2009 | 2011 | 2012 | 2014 |
| ≤1500 | 2008 | 2010 | 2011 | 2013 |

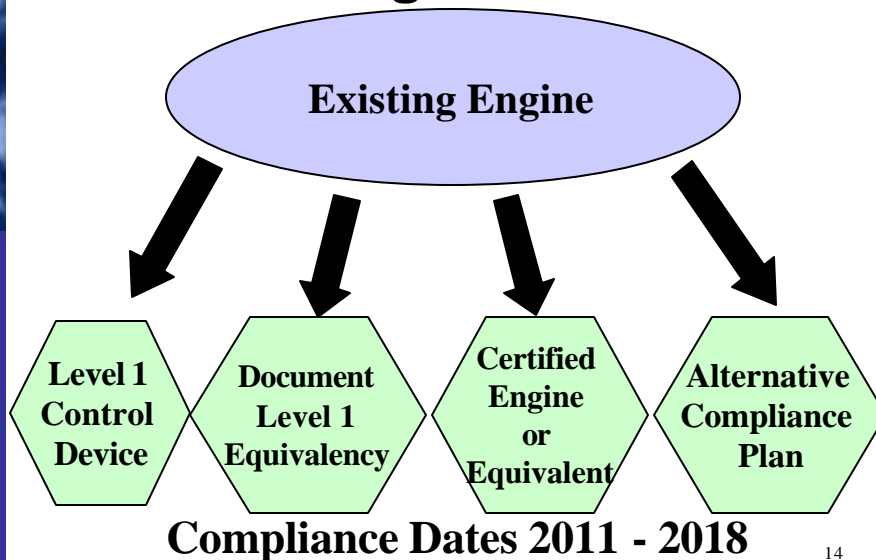
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Existing Fishing Vessel Overview

- ◆ Typically Tier 0 Engines
- ◆ Proposed Compliance Dates (2011-2018)
- ◆ Targeting a 25% PM Reduction fleet wide
- ◆ Potential Compliance Options
 - Minimum Level 1 Emission Control or,
 - Certified Engine
- ◆ Retain opportunity for Carl Moyer funds
 - Additional PM, NOx, and other emission reductions

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Fishing Vessels



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Existing Fishing Vessel Compliance Dates

| Annual Hours of Operation | Engine Model Year Pre-1975 | Engine Model Year 1976-1989 | Engine Model Year 1990-1999 | Engine Model Year 2000-2006 |
|---------------------------|----------------------------|-----------------------------|-----------------------------|-----------------------------|
| >300-<1500 | 2012 | 2014 | 2016 | 2018 |
| =1500 | 2011 | 2013 | 2015 | 2017 |

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Alternative Compliance Plan

- ◆ Only harbor craft under direct control of the owner/operator per port
- ◆ Operators may comply using alternative emission control strategies.
- ◆ Must achieve equivalent or greater reductions
- ◆ Applications include a public review process

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Potential Issues

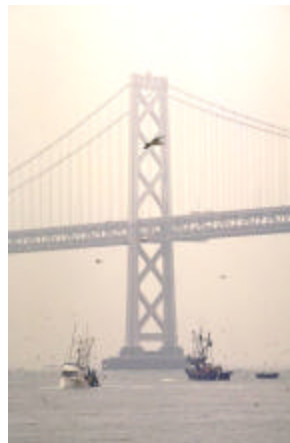
- ◆ Economic Impacts
- ◆ Stringency and timing of new U.S. EPA engine standards
- ◆ Limited Strategies Available
- ◆ Technical Feasibility



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Outstanding Items

- ◆ Compliance Timelines
- ◆ Low Use Exemptions
- ◆ Applicability with other ATCM / Regulations
- ◆ Tier I Rebuilds
- ◆ Additional Requirements for Higher Use Vessels

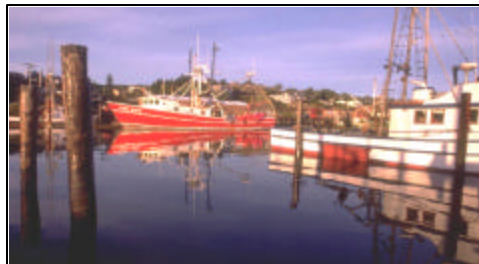


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Commercial Harbor Craft Cost Estimates

- ◆ Separated Non-fishing and Fishing Vessels
- ◆ Estimated Costs for Engine Replacement and Exhaust Retrofit

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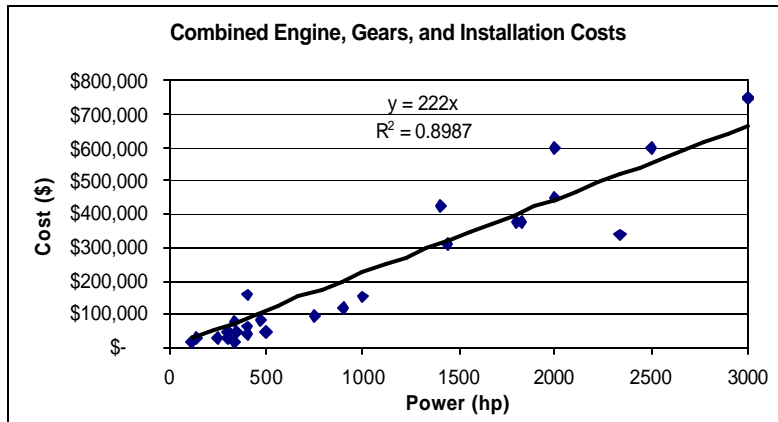
Non-Fishing Vessel Costs

Replace Engines with Tier II Engines

- ◆ Carl Moyer and Engine Manufacturers Data for Propulsion Engines = \$222/hp
 - ◆ Useful Life of ~ 18 years
- ◆ Carl Moyer Data for Auxiliary Engines = \$248/hp
 - ◆ Useful Life of ~ 14 years
- ◆ Investigating any Additional Costs for Tier III Engines

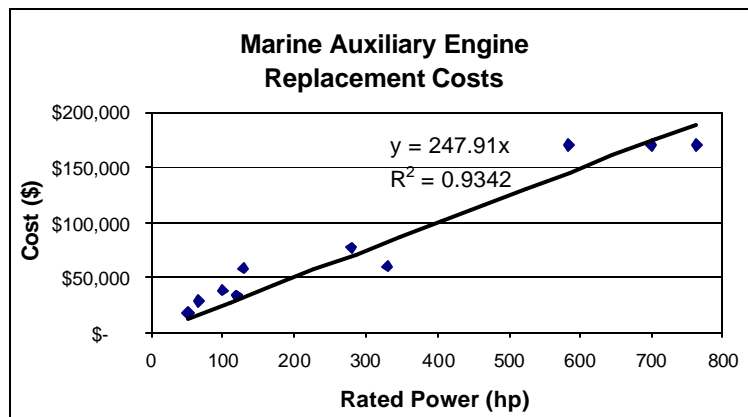
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Non-Fishing Propulsion Replacement Engine Costs



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Non-Fishing Auxiliary Replacement Engine Costs



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Fishing Vessel Overview

Targeting a 25% PM Reduction Fleet
Wide using a Level 1 Type Emission
Control

- ◆ Estimating a DOC = \$11/hp
 - ◆ Useful Life ~ 5 years